



**BURLINGTON
ENVIRONMENTAL**

RCRA PERMIT
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ITEM NUMBER _____
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WAD 2917

FF#8c

October 1, 1993
Project 624878

10/1/93

SENT VIA CERTIFIED MAIL NO. P 112 414 917

Mr. David Croxton
U.S. Environmental Protection Agency
1200 Sixth Avenue, M/S HW-106
Seattle, WA 98101

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OCT 05 1993

RCRA PERMITS SECTION

FILE COPY

Mr. Croxton:

Subject: Request for Variance from Burlington Environmental Inc. Pier 91 Work Plan

Enclosed is the data supplement and associated discussion for the Burlington Environmental Inc. request for variance from the Pier 91 RFI work plan. This variance requests removing Port of Seattle monitoring well W-10 from the monthly water level measurements and quarterly sampling currently being conducted at Burlington's Pier 91 facility.

If you have questions, please contact me at (206) 654-6608.

Sincerely yours,

BURLINGTON ENVIRONMENTAL INC.

Andy Maloy
Project Manager
Technical Services Division

AM/g:\users\beckyk\disk52\2474.ltr

USEPA RCRA



3012440

Burlington Environmental Inc.
2203 Airport Way South • Suite 400 • Seattle, WA 98134
Phone 206/223-0336 • 206/223-0500 • FAX 206/223-7426



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Water Level Elevations and Floating
Product Thickness
Pier 91 Facility

Page: 1 of 8
Date: 09/28/93

DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	△ WATER ELEV. ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
02/25/92	CP-103A	5.13	10:40	5.25	.00	-.12	N/A	-.12
02/25/92	CP-104A	5.29	15:00	3.68	.00	1.61	N/A	1.61
02/25/92	CP-105A	5.57	08:45	3.75	.00	1.82	N/A	1.82
02/25/92	CP-106A	5.91	15:50	4.70	.00	1.21	N/A	1.21
02/25/92	CP-107	4.98	11:50	4.33	.00	.65	N/A	.65
02/25/92	CP-108A	4.65	09:40	4.00	.00	.65	N/A	.65
02/25/92	CP-109	6.18	16:05	6.13	.65	.05	N/A	.63
02/25/92	CP-110	5.25	11:25	4.58	.00	.67	N/A	.67
03/26/92	CP-103A	5.13	10:22	5.24	.00	-.11	.01	-.11
03/26/92	CP-104A	5.29	11:10	4.74	.00	.55	-1.06	.55
03/26/92	CP-105A	5.57	09:45	4.68	.00	.89	-.93	.89
03/26/92	CP-106A	5.91	10:00	5.21	.00	.70	-.51	.70
03/26/92	CP-107	4.98	10:55	5.62	.60	-.64	-1.29	-.12
03/26/92	CP-108A	4.65	10:13	4.65	.00	.00	-.65	.00
03/26/92	CP-109	6.18	11:37	6.73	.62	-.55	-.60	.00
03/26/92	CP-110	5.25	10:37	5.60	.42	-.35	-1.02	.04
04/17/92	CP-103A	5.13	10:25	5.29	.00	-.16	-.05	-.16
04/17/92	CP-104A	5.29	11:00	4.91	.00	.38	-.17	.38
04/17/92	CP-105A	5.57	09:40	4.93	.00	.64	-.25	.64
04/17/92	CP-106A	5.91	09:45	5.19	.00	.72	.02	.72
04/17/92	CP-107	4.98	10:50	5.51	.34	-.53	.11	-.23
04/17/92	CP-108A	4.65	10:00	4.73	.00	-.08	-.08	-.08
04/17/92	CP-109	6.18	11:40	6.68	.54	-.50	.05	-.01
04/17/92	CP-110	5.25	10:40	5.56	.29	-.31	.04	-.03
05/14/92	CP-103A	5.13	11:42	5.72	.00	-.59	-.43	-.59
05/14/92	CP-104A	5.29	12:20	5.25	.00	.04	-.34	.04
05/14/92	CP-105A	5.57	11:20	5.38	.00	.19	-.45	.19
05/14/92	CP-106A	5.91	11:27	5.52	.00	.39	-.33	.39
05/14/92	CP-107	4.98	12:07	5.74	.27	-.76	-.23	-.52
05/14/92	CP-108A	4.65	11:33	5.15	.00	-.50	-.42	-.50
05/14/92	CP-109	6.18	12:40	7.19	.66	-1.01	-.51	-.41
05/14/92	CP-110	5.25	11:55	6.19	.60	-.94	-.63	-.36

1) Change in Water Elevation since last measurement

2) Measurements Based on City of Seattle Datum

Water Level Elevations and Floating
Product Thickness
Pier 91 Facility

Page: 2 of 8
Date: 09/28/93

DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	△ WATER ELEV. ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
06/30/92	CP-103A	5.13	16:10	6.11	.00	-.98	-.39	-.98
06/30/92	CP-104A	5.29	16:34	6.08	.00	-.79	-.83	-.79
06/30/92	CP-105A	5.57	15:36	5.92	.00	-.35	-.54	-.35
06/30/92	CP-106A	5.91	15:40	5.72	.00	.19	-.20	.19
06/30/92	CP-107	4.98	16:25	6.01	.10	-1.03	-.27	-.94
06/30/92	CP-108A	4.65	16:04	5.84	.00	-1.19	-.69	-1.19
06/30/92	CP-109	6.18	15:50	7.50	.58	-1.32	-.31	-.80
06/30/92	CP-110	5.25	16:17	6.55	.63	-1.30	-.36	-.70
07/24/92	CP-103A	5.13	00:00	6.60	.00	-1.47	-.49	-1.47
07/24/92	CP-104A	5.29	00:00	5.84	.00	-.55	.24	-.55
07/24/92	CP-105A	5.57	00:00	6.04	.00	-.47	-.12	-.47
07/24/92	CP-106A	5.91	00:00	5.90	.00	.01	-.18	.01
07/24/92	CP-107	4.98	00:00	6.14	.16	-1.16	-.13	-1.02
07/24/92	CP-108A	4.65	00:00	5.86	.00	-1.21	-.02	-1.21
07/24/92	CP-109	6.18	00:00	7.70	.70	-1.52	-.20	-.89
07/24/92	CP-110	5.25	00:00	6.67	.69	-1.42	-.12	-.76
08/10/92	CP-103A	5.13	14:50	6.74	.00	-1.61	-.14	-1.61
08/10/92	CP-104A	5.29	15:25	6.20	.00	-.91	-.36	-.91
08/10/92	CP-105A	5.57	14:05	6.16	.00	-.59	-.12	-.59
08/10/92	CP-106A	5.91	14:20	5.92	.00	-.01	-.02	-.01
08/10/92	CP-107	4.98	15:15	6.14	.05	-1.16	.00	-1.11
08/10/92	CP-108A	4.65	14:40	6.20	.00	-1.55	-.34	-1.55
08/10/92	CP-109	6.18	14:30	7.65	.55	-1.47	.05	-.97
08/10/92	CP-110	5.25	15:00	6.61	.47	-1.36	.06	-.91
09/30/92	CP-103A	5.13	16:04	6.82	.00	-1.69	-.08	-1.69
09/30/92	CP-104A	5.29	16:30	5.96	.00	-.67	.24	-.67
09/30/92	CP-105A	5.57	15:15	6.28	.00	-.71	-.12	-.71
09/30/92	CP-106A	5.91	15:22	5.99	.00	-.08	-.07	-.08
09/30/92	CP-107	4.98	16:22	6.24	.08	-1.26	-.10	-1.19
09/30/92	CP-108A	4.65	15:56	6.22	.00	-1.57	-.02	-1.57
09/30/92	CP-109	6.18	15:42	7.78	.58	-1.60	-.13	-1.08
09/30/92	CP-110	5.25	16:15	6.64	.49	-1.39	-.03	-.92

1) Change in Water Elevation since last measurement

2) Measurements Based on City of Seattle Datum

Water Level Elevations and Floating
Product Thickness
Pier 91 Facility

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Date: 09/28/93

DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	△ WATER ELEV. ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
10/30/92	CP-103A	5.13	14:33	6.72	.00	-1.59	.10	-1.59
10/30/92	CP-104A	5.29	14:49	6.13	.00	-.84	-.17	-.84
10/30/92	CP-105A	5.57	14:10	6.40	.00	-.83	-.12	-.83
10/30/92	CP-106A	5.91	14:20	6.92	.00	-1.01	-.93	-1.01
10/30/92	CP-107	4.98	14:59	6.30	.07	-1.32	-.06	-1.25
10/30/92	CP-108A	4.65	14:25	6.20	.00	-1.55	.02	-1.55
10/30/92	CP-109	6.18	15:30	7.79	.54	-1.61	-.01	-1.12
10/30/92	CP-110	5.25	14:45	6.62	.55	-1.37	.02	-.84
11/03/92	W-10	6.11	13:00	7.85	.00	-1.74	N/A	-1.74
11/30/92	CP-103A	5.13	16:44	6.33	.00	-1.20	.39	-1.20
11/30/92	CP-104A	5.29	17:14	5.12	.00	.17	1.01	.17
11/30/92	CP-105A	5.57	16:31	5.22	.00	.35	1.18	.35
11/30/92	CP-107	4.98	17:00	5.50	.00	-.52	.80	-.52
11/30/92	CP-108A	4.65	16:36	5.38	.00	.73	.82	-.73
11/30/92	CP-110	5.25	16:53	6.02	.42	-.77	.60	-.37
12/21/92	CP-103A	5.13	15:20	5.92	.00	-.79	.41	-.79
12/21/92	CP-104A	5.29	15:44	4.65	.00	.64	.47	.64
12/21/92	CP-105A	5.57	15:03	4.62	.00	.95	.60	.95
12/21/92	CP-106A	5.91	16:15	5.23	.00	.68	1.69	.68
12/21/92	CP-107	4.98	15:34	5.11	.06	-.13	.39	-.07
12/21/92	CP-108A	4.65	15:10	4.80	.00	-.15	.58	-.15
12/21/92	CP-109	6.18	16:32	6.63	.40	-.45	1.16	-.09
12/21/92	CP-110	5.25	15:27	5.45	.24	-.20	.57	.02
12/21/92	CP-111	5.33	15:55	7.00	.00	-1.67	N/A	-1.67
12/21/92	CP-112	4.83	16:00	5.03	.00	-.20	N/A	-.20
12/21/92	CP-113	5.12	15:49	4.20	.00	.92	N/A	.92
12/21/92	CP-114	5.76	16:05	4.65	.00	1.11	N/A	1.11
12/21/92	CP-115A	5.48	16:45	4.56	.00	.92	N/A	.92
12/21/92	CP-116	5.62	16:55	5.21	.00	.41	N/A	.41
12/21/92	CP-117	6.13	16:50	5.70	.10	.43	N/A	.51
12/21/92	CP-118	5.05	16:35	5.28	.17	-.23	N/A	-.07
12/21/92	CP-119	4.56	16:29	4.58	.33	-.02	N/A	.27
12/21/92	CP-121	5.51	16:40	4.57	.00	.94	N/A	.94

1) Change in Water Elevation since last measurement

2) Measurements Based on City of Seattle Datum

Water Level Elevations and Floating
Product Thickness
Pier 91 Facility

Page: 4 of 8
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DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	△ WATER ELEV ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
01/29/93	CP-103A	5.13	15:26	6.92	.00	-1.79	-1.00	-1.79
01/29/93	CP-104A	5.29	15:54	4.81	.00	.48	-.16	.48
01/29/93	CP-105A	5.57	14:43	4.85	.00	.72	-.23	.72
01/29/93	CP-106A	5.91	14:51	5.25	.00	.66	-.02	.66
01/29/93	CP-107	4.98	15:45	5.35	.20	-.37	-.24	-.19
01/29/93	CP-108A	4.65	15:11	4.90	.00	-.25	-.10	-.25
01/29/93	CP-109	6.18	15:00	6.79	.48	-.61	-.16	-.18
01/29/93	CP-110	5.25	15:37	5.66	.31	-.41	-.21	-.11
02/24/93	CP-103A	5.13	10:25	5.13	.00	.00	1.79	.00
02/24/93	CP-104A	5.29	12:10	5.26	.00	.03	-.45	.03
02/24/93	CP-105A	5.57	12:30	5.42	.00	.15	-.57	.15
02/24/93	CP-106A	5.91	13:00	5.44	.00	.47	-.19	.47
02/24/93	CP-107	4.98	11:50	5.72	.21	-.74	-.37	-.55
02/24/93	CP-108A	4.65	09:50	5.30	.00	-.65	-.40	-.65
02/24/93	CP-109	6.18	12:50	7.14	.54	-.96	-.35	-.47
02/24/93	CP-110	5.25	11:30	6.02	.44	-.77	-.36	-.35
03/05/93	CP-122B	4.76	10:00	5.30	.00	-.54	N/A	-.54
03/06/93	CP-122B	4.76	04:00	5.10	.00	-.34	.20	-.34
03/07/93	CP-122B	4.76	04:00	4.82	.00	-.06	.28	-.06
03/08/93	CP-122B	4.76	04:00	4.77	.00	-.01	.05	-.01
03/31/93	CP-103A	5.13	08:33	5.78	.00	-.65	-.65	-.65
03/31/93	CP-104A	5.29	09:37	4.86	.00	.43	.40	.43
03/31/93	CP-105A	5.57	08:50	4.82	.00	.75	.60	.75
03/31/93	CP-106A	5.91	09:58	5.23	.00	.68	.21	.68
03/31/93	CP-107	4.98	09:28	5.25	.06	-.27	.47	-.21
03/31/93	CP-108A	4.65	08:00	4.95	.00	-.30	.35	-.30
03/31/93	CP-109	6.18	10:10	6.75	.48	-.57	.39	-.14
03/31/93	CP-110	5.25	09:12	5.59	.22	-.34	.43	-.13
03/31/93	CP-111	5.33	10:50	7.20	.00	-1.87	-.20	-1.87
03/31/93	CP-112	4.83	10:58	5.10	.00	-.27	-.07	-.27

1) Change in Water Elevation since last measurement

2) Measurements Based on City of Seattle Datum

Water Level Elevations and Floating
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Page: 5 of 8
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DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	△ WATER ELEV. ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
03/31/93	CP-113	5.12	11:03	4.44	.00	.68	-.24	.68
03/31/93	CP-114	5.76	11:10	4.91	.00	.85	-.26	.85
03/31/93	CP-115A	5.48	11:32	4.77	.00	.71	-.21	.71
03/31/93	CP-116	5.62	11:37	5.33	.00	.29	-.12	.29
03/31/93	CP-117	6.13	11:55	5.66	.15	.47	.04	.59
03/31/93	CP-118	5.05	12:45	5.51	.32	-.46	-.23	-.17
03/31/93	CP-119	4.56	12:55	4.49	.27	.07	.09	.31
03/31/93	CP-121	5.51	12:10	4.76	.00	.75	-.19	.75
03/31/93	CP-122B	0.00	12:30	5.30	.00	-5.30	-.53	-5.30
03/31/93	W-10	6.11	08:15	7.54	.00	-1.43	.31	-1.43
04/16/93	CP-103A	5.13	09:00	5.72	.00	-.59	.06	-.59
04/16/93	CP-104A	5.29	09:20	4.56	.00	.73	.30	.73
04/16/93	CP-105A	5.57	09:35	4.51	.00	1.06	.31	1.06
04/16/93	CP-106A	5.91	09:45	5.15	.00	.76	.08	.76
04/16/93	CP-107	4.98	12:00	5.10	.09	-.12	.15	-.04
04/16/93	CP-108A	4.65	08:50	4.69	.00	-.04	.26	-.04
04/16/93	CP-109	6.18	11:30	6.46	.34	-.28	.29	.02
04/16/93	CP-110	5.25	11:50	5.45	.24	-.20	.14	.02
04/16/93	CP-111	5.33	09:10	7.10	.00	-1.77	.10	-1.77
04/16/93	CP-112	4.83	09:15	5.00	.00	-.17	.10	-.17
04/16/93	CP-113	5.12	09:30	4.09	.00	1.03	.35	1.03
04/16/93	CP-114	5.76	09:40	4.53	.00	1.23	.38	1.23
04/16/93	CP-115A	5.48	10:00	4.43	.00	1.05	.34	1.05
04/16/93	CP-116	5.62	10:45	5.10	.00	.52	.23	.52
04/16/93	CP-117	6.13	10:55	5.45	.14	.68	.21	.79
04/16/93	CP-118	5.05	11:10	5.23	.27	-.18	.28	.05
04/16/93	CP-119	4.56	11:20	5.20	.10	-.64	-.71	-.54
04/16/93	CP-121	5.51	10:10	4.41	.00	1.10	.35	1.10
04/16/93	CP-122B	0.00	10:35	17.10	.00	-17.10	-11.80	-17.10
04/16/93	MW-39-3	5.14	12:10	5.66	.97	-.52	N/A	.34
04/16/93	W-10	6.11	08:15	7.46	.00	-1.35	.08	-1.35
05/20/93	CP-103A	5.13	08:37	5.80	.00	-.67	-.08	-.67
05/20/93	CP-104A	5.29	08:55	4.75	.00	.54	-.19	.54
05/20/93	CP-105A	5.57	09:05	4.82	.00	.75	-.31	.75

1) Change in Water Elevation since last measurement

2) Measurements Based on City of Seattle Datum

Water Level Elevations and Floating
Product Thickness
Pier 91 Facility

Page: 6 of 8
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DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	△ WATER ELEV. ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
05/20/93	CP-106A	5.91	09:27	5.16	.00	.75	-.01	.75
05/20/93	CP-107	4.98	11:30	4.80	.10	.18	.30	.26
05/20/93	CP-108A	4.65	08:30	4.92	.00	-.27	-.23	-.27
05/20/93	CP-109	6.18	11:00	6.90	.70	-.72	-.44	-.09
05/20/93	CP-110	5.25	11:20	5.23	.34	.02	.22	.34
05/20/93	CP-111	5.33	08:44	7.14	.00	-1.81	-.04	-1.81
05/20/93	CP-112	4.83	08:50	5.08	.00	-.25	-.08	-.25
05/20/93	CP-113	5.12	09:00	4.32	.00	.80	-.23	.80
05/20/93	CP-114	5.76	09:15	4.80	.00	.96	-.27	.96
05/20/93	CP-115A	5.48	09:35	4.66	.00	.82	-.23	.82
05/20/93	CP-116	5.62	10:05	5.36	.12	.26	-.26	.37
05/20/93	CP-117	6.13	10:15	6.00	.50	.13	-.55	.53
05/20/93	CP-118	5.05	10:42	5.80	.55	-.75	-.57	-.26
05/20/93	CP-119	4.56	10:50	5.00	.75	-.44	.20	.24
05/20/93	CP-121	5.51	09:40	4.65	.00	.86	-.24	.86
05/20/93	CP-122B	0.00	11:50	5.18	.00	-5.18	11.92	-5.18
05/20/93	MW-39-3	5.14	11:45	5.75	.80	-.61	-.09	.10
05/20/93	W-10	6.11	08:00	7.54	.00	-1.43	-.08	-1.43
06/10/93	CP-103A	5.13	00:00	5.78	.00	-.65	.02	-.65
06/10/93	CP-104A	5.29	00:00	4.58	.00	.71	.17	.71
06/10/93	CP-105A	5.57	00:00	4.60	.00	.97	.22	.97
06/10/93	CP-106A	5.91	00:00	5.07	.00	.84	.09	.84
06/10/93	CP-107	4.98	00:00	4.95	.00	.03	-.15	.03
06/10/93	CP-108A	4.65	00:00	4.69	.00	-.04	.23	-.04
06/10/93	CP-109	6.18	00:00	6.65	.64	-.47	.25	.10
06/10/93	CP-110	5.25	00:00	5.37	.22	-.12	-.14	.08
06/10/93	CP-111	5.33	00:00	6.92	.00	-1.59	.22	-1.59
06/10/93	CP-112	4.83	00:00	4.95	.00	-.12	.13	-.12
06/10/93	CP-113	5.12	00:00	4.09	.00	1.03	.23	1.03
06/10/93	CP-114	5.76	00:00	4.60	.00	1.16	.20	1.16
06/10/93	CP-115A	5.48	00:00	4.48	.00	1.00	.18	1.00
06/10/93	CP-116	5.62	00:00	5.11	.00	.51	.25	.51
06/10/93	CP-117	6.13	00:00	5.45	.16	.68	.55	.81
06/10/93	CP-118	5.05	00:00	5.59	.68	-.54	.21	.06
06/10/93	CP-119	4.56	00:00	4.55	.55	.01	.45	.50

1) Change in Water Elevation since last measurement

2) Measurements Based on City of Seattle Datum

Water Level Elevations and Floating
Product Thickness
Pier 91 Facility

Page: 7 of 8
Date: 09/28/93


DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	△ WATER ELEV. ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
06/10/93	CP-121	5.51	00:00	4.46	.00	1.05	.19	1.05
06/10/93	CP-122B	0.00	00:00	5.19	.00	-5.19	-.01	-5.19
06/10/93	MW-39-3	5.14	12:00	6.08	1.44	-.94	-.33	.34
06/10/93	W-10	6.11	08:00	7.42	.00	-1.31	.12	-1.31
07/21/93	CP-103A	5.13	08:43	6.19	.00	-1.06	-.41	-1.06
07/21/93	CP-104A	5.29	09:05	5.19	.00	.10	-.61	.10
07/21/93	CP-105A	5.57	09:28	5.10	.00	.47	-.50	.47
07/21/93	CP-106A	5.91	09:55	5.41	.00	.50	-.34	.50
07/21/93	CP-107	4.98	11:20	6.51	.09	-1.53	-1.56	-1.45
07/21/93	CP-108A	4.65	08:30	5.41	.00	-.76	-.72	-.76
07/21/93	CP-109	6.18	10:41	6.92	.35	-.74	-.27	-.42
07/21/93	CP-110	5.25	11:10	6.56	.29	-1.31	-1.19	-1.03
07/21/93	CP-111	5.33	08:52	7.24	.00	-1.91	-.32	-1.91
07/21/93	CP-112	4.83	09:00	5.32	.00	-.49	-.37	-.49
07/21/93	CP-113	5.12	09:15	4.80	.00	.32	-.71	.32
07/21/93	CP-114	5.76	10:10	5.33	.00	.43	-.73	.43
07/21/93	CP-115A	5.48	09:50	5.14	.00	.34	-.66	.34
07/21/93	CP-116	5.62	12:03	5.81	.10	-.19	-.70	-.09
07/21/93	CP-117	6.13	11:50	6.35	.52	-.22	-.90	.20
07/21/93	CP-118	5.05	10:50	6.13	.24	-1.08	-.54	-.86
07/21/93	CP-119	4.56	10:55	5.19	.66	-.63	-.64	-.03
07/21/93	CP-121	5.51	09:45	5.13	.00	.38	-.67	.38
07/21/93	CP-122B	0.00	10:20	5.17	.00	-5.17	.02	-5.17
07/21/93	MW-39-3	5.14	11:30	6.06	.76	-.92	.02	-.24
07/21/93	W-10	6.11	07:55	7.89	.00	-1.78	-.47	-1.78
08/18/93	CP-103A	5.13	11:31	6.43	.00	-1.30	-.24	-1.30
08/18/93	CP-104A	5.29	14:03	5.52	.00	-.23	-.33	-.23
08/18/93	CP-105A	5.57	08:16	5.51	.00	.06	-.41	.06
08/18/93	CP-106A	5.91	12:09	5.62	.00	.29	-.21	.29
08/18/93	CP-107	4.98	13:38	5.87	.12	-.89	.64	-.78
08/18/93	CP-109	6.18	15:29	7.42	.62	-1.24	-.50	-.68
08/18/93	CP-110	5.25	13:48	7.05	.55	-1.80	-.49	-1.27
08/18/93	CP-111	5.33	11:23	7.41	.00	-2.08	-.17	-2.08
08/18/93	CP-112	4.83	13:24	5.55	.00	-.72	-.23	-.72

1) Change in Water Elevation since last measurement

2) Measurements Based on City of Seattle Datum

Water Level Elevations and Floating
Product Thickness
Pier 91 Facility

Page: 8 of 8
Date: 09/28/93

DATE	SITE	MP ELEVATION feet ⁽²⁾	TIME	DEPTH TO WATER feet	FLOATING PRODUCT THICKNESS feet	WATER ELEV. feet ⁽²⁾	 WATER ELEV. ⁽¹⁾ feet	EQUIV. FRESH WATER HEAD feet ⁽²⁾
08/18/93	CP-113	5.12	12:42	5.18	.00	-.06	-.38	-.06
08/18/93	CP-114	5.76	08:53	5.72	.00	.04	-.39	.04
08/18/93	CP-115A	5.48	13:12	5.52	.00	-.04	-.38	-.04
08/18/93	CP-116	5.62	14:28	6.14	.13	-.52	-.33	-.39
08/18/93	CP-117	6.13	14:40	6.64	.60	-.51	-.29	-.01
08/18/93	CP-118	5.05	15:06	6.36	.62	-1.31	-.23	-.76
08/18/93	CP-119	4.56	15:18	5.45	.71	-.89	-.26	-.24
08/18/93	CP-121	5.51	13:20	5.51	.00	.00	-.38	.00
08/18/93	CP-122B	0.00	11:03	5.12	.00	-5.12	.05	-5.12
08/18/93	MW-39-3	5.14	13:29	6.51	.95	-1.37	-.45	-.52
08/18/93	W-10	6.11	07:55	8.00	.00	-1.89	-.11	5.30

DATA SUPPLEMENT AND DISCUSSION
FOR BURLINGTON PIER 91 RFI WORK PLAN
VARIANCE REQUEST

October 1, 1993

As discussed in a meeting held on August 9, 1993 between representatives of Burlington Environmental Inc. (Burlington) and the U.S. Environmental Protection Agency (USEPA), Burlington presents the attached data and discussion to the USEPA. The discussion and data concern the May 3, 1993 Pier 91 RFI work plan variance request to omit Port of Seattle (Port) monitoring well W-10 from monthly water level measurements. The rationale as presented in the variance request is summarized below.

- Water levels in W-10 are measured with a dedicated air bubbler that is only accurate to within approximately one inch.
- Due to its location approximately midway between CP-103A and CP-108A, W-10 is not likely to provide much additional information on the spatial distribution of water levels in the shallow aquifer.
- The dedicated bubbler takes at least 30 minutes to measure the water level compared to 1-2 minutes using an electronic water-level indicator.
- Special arrangements must be made with Port personnel and/or their consultants each time the water level is measured in W-10.
- There is not enough room in the top of the casing to accommodate water-level detection instruments. Therefore the presence and/or thickness of floating product cannot be observed.

In order to assess the accuracy and validity of data obtained from W-10, groundwater potentiometric maps for March, April, May, June, July, and August 1993 were generated with and without water level data from W-10. These twelve maps are attached along with the water level data used to generate the maps.

Comparison of each pair of monthly maps indicates that W-10 may be providing erroneously low water level data. Maps generated without data from W-10 indicate a fairly consistent flow gradient to the southwest with a slight high generally present in the vicinity of CP-110. However, when the maps are generated including water level data from W-10, a significant low centered on W-10 is present. Based on the general southwest gradient, W-10 should exhibit roughly the same hydraulic head as wells CP-112 and CP-107. However, water level data collected from W-10 is generally about 1.2 feet lower than data collected from CP-112 and CP-107. These data indicate that water level data obtained from W-10 do not correspond well with

data collected from all other wells included in the monthly water level measurement. Possible explanations for this discrepancy include:

- the dedicated bubbler is providing erroneous water level data;
- survey data for well W-10 is incorrect; or
- W-10 is not screened in the same water bearing zone as the other shallow wells.

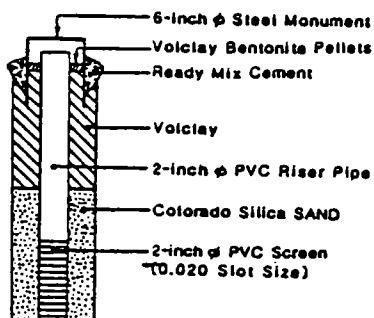
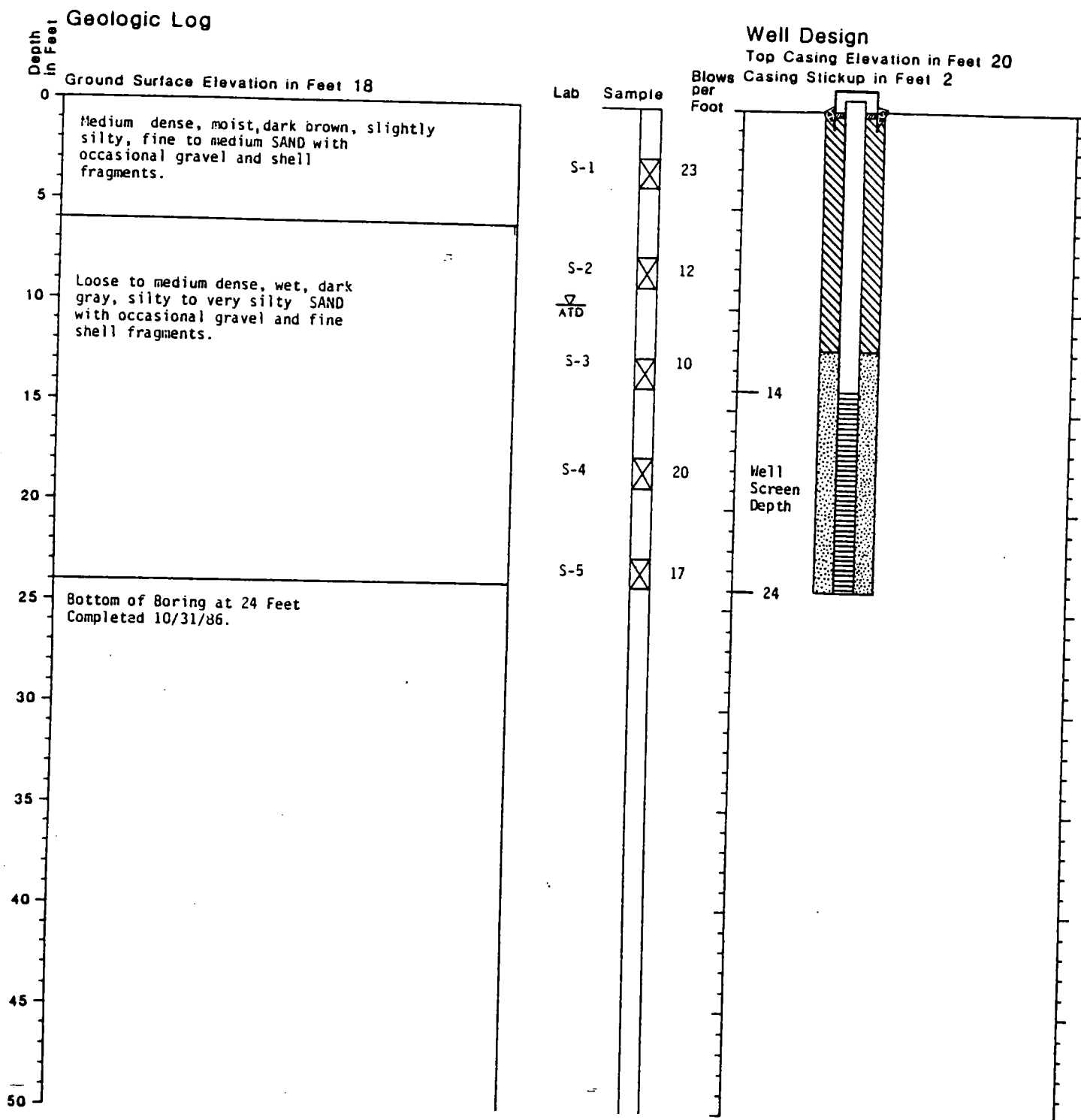
It is possible that the dedicated bubbler is providing erroneous results. However, the only sure method of checking the accuracy of the bubbler system is to compare data collected with the bubbler with data collected using a direct method such as an electronic water-level indicator. Port representatives were approached about modifying W-10 to allow using an electronic water-level indicator. They indicated that they would not be willing to modify W-10 in any way.

Survey data for W-10 was field verified after the water level discrepancy became apparent. It appears that the survey data is accurate.

In order to assess if W-10 is screened within the same water bearing zone as the on-site shallow monitoring wells, well logs for W-10, CP-103A, and CP-109A were reviewed. These three well logs are attached. Comparison of the well log for W-10 with CP-103A and CP-109A well logs indicate that wells CP-103A and CP-109A are screened within a fine to medium sand from approximately 5 to 15 feet below ground surface (bgs), while W-10 is screened within a silty sand layer from approximately 14 to 24 feet (bgs). The upper sand unit corresponds with the shallow aquifer. Previous and current investigations at the Burlington facility indicate that the hydraulic conductivity of the upper sand unit is a minimum of 30 times greater than the hydraulic conductivity of the underlying silty sand unit. Therefore, water levels measured in W-10 would not be expected to correspond with water levels measured in wells screened within the upper sand unit.

Since W-10 is not screened within the upper aquifer, Burlington requests that W-10 not be included in the monthly water level measurements or in the quarterly groundwater sampling at the Burlington Pier 91 facility. The need for an additional well in the vicinity of W-10 will be addressed in an integrated off-site RFI work plan.

Boring Log and Construction Data for Well W-10



- ⊗ 2.5-inch I.D. Split Spoon Sample
- * No Sample Recovery

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1039-07 November 1986
HART-CROWSER & associates, inc.
Figure A-15

LOG OF EXPLORATORY BORING

PROJECT NAME Chemical Processors
LOCATION Pier 91
DRILLED BY Tacoma Pump & Drill
DRILL METHOD H.S. Auger
LOGGED BY S. Nelson

BORING NO. CP-108A
PAGE 1 OF 2
REFERENCE ELEV. 4.67'
TOTAL DEPTH 21.50'
DATE COMPLETED 12/28/88

SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT (per six inches)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-LOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
								0 - 0.25 foot: ASPHALT. (AS)
1	3" SS	11-9-12						0.25 - 2.5 feet: GRAVELLY SAND; brown, fine to medium, 15% subround gravel to 1 inch in diameter. Trace to 5% shell fragments, 0-5% silt, compact, dry. (SW) (FILL)
2	3" SS	7-10-11		5				2.5 - 15.8 feet: SAND; light olive brown to olive, fine to medium, 5-10% subround gravel to 1 inch in diameter, 0-5% shell debris, some banding. Saturated, with petroleum odor below 5.5 feet. (SP)
3	3" SS	6-10-11						
4	2" SS	5-6-7						— @ 8.0-9.0 feet: coarse sand layer with strong petroleum odor.
5	2" SS	4-2-9		10				
6	3" SS	11-35-50		15				15.8 - 24.0 feet: SILTY SAND; olive, very fine to medium, 5-40% silt, 0-10% wood debris, organic decay - H2S odor. Saturated. (SM)
				20				

REMARKS

1) Specific Location: Garfield / East Route. 2) H.S. Auger = Hollow Stem Auger. 3) SS = Split Spoon Sample. 4) Water measurement at 5.5 feet BGS, at 10:15 on 12/28/88. See ADDITIONAL REMARKS at end of Description column.



LOG OF EXPLORATORY BORING

PROJECT NAME Chemical Processors
 LOCATION Pier 91
 DRILLED BY Tacoma Pump & Drill
 DRILL METHOD H.S. Auger
 LOGGED BY S. Nelson

BORING NO. CP-108A
 PAGE 2 OF 2
 REFERENCE ELEV. 4.67'
 TOTAL DEPTH 21.50'
 DATE COMPLETED 12/28/88

SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT (per six inches)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-LOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
7	3" SS	12-14-12						15.8 - 21.5 feet: SILTY SAND; see previous page for Description.
								Borehole terminated at 21.5 BGS on 12/28/88.
								ADDITIONAL REMARKS: 5) Reference elevation at top of PVC casing, City of Seattle datum. Lithologic description for CP-108-A is the same as CP-108-B to depth of 21.5 feet.

REMARKS

1) Specific Location: Garfield / East Route. 2) H.S. Auger = Hollow Stem Auger. 3) SS = Split Spoon Sample. 4) Water measurement at 5.5 feet BGS, at 10:15 on 12/28/88. See ADDITIONAL REMARKS at end of Description column.





PROJECT Chempro, Pier 91

Page 1 of 2

Location See Figure 2.1

Boring No. CP-103-B

Surface Elevation

Drilling Method Cable Tool Rig with 6 B

Total Depth 69.5'

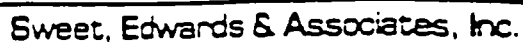
Drilled By Holt Drilling

Date Completed 12/2/87

Logged By S. R. Henshaw

WELL DETAILS	PENE- TRATION TIME/ RATE	DEPTH (FEET)	SAMPLE		PERME- ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
Flush Mount Security Casing w/Locking Cap							0-15' <u>GRAVELLY SAND</u> , gray, medium to coarse grained, 20-30% gravel (basalt, quartzite) up to 4" in diameter, petroleum observed at 10' saturated at 10'.	
Schedule 40 PVC Casing		10				GW		
2-inch		20	103-A	SPT		SM	15-28' <u>SILTY SAND</u> , gray, medium grained, 15-25% silt, 5-10% sub- rounded gravel (basalt) & cobbles up to 4" diam. less than 5% shell fragm. petroleum odor, sat.	
2-inch PVC Screen w/0.010" Slots		30	103-B	SPT		SP	28-60' <u>SAND</u> , gray, medium grained, clean, less than 5% silt, poorly stratified, slight petroleum odor, saturated.	
Colorado Silica Sand 8-12		40	103-C	SPT				
End Cap		50					50-51.5' strong H ₂ S odor, saturated.	
Slough		60				SM	60-66.5' <u>SILTY SAND TO SANDY SILT</u> description on following page	
		70	103-D	SPT				

SEA-300-0



PROJECT Chempro, Pier 91

Page 1 of

Location See Figure 2.1

Boring No. CP-103-A

Surface Elevation _____

Drilling Method Cable Tool Rig with

Total Depth 15'

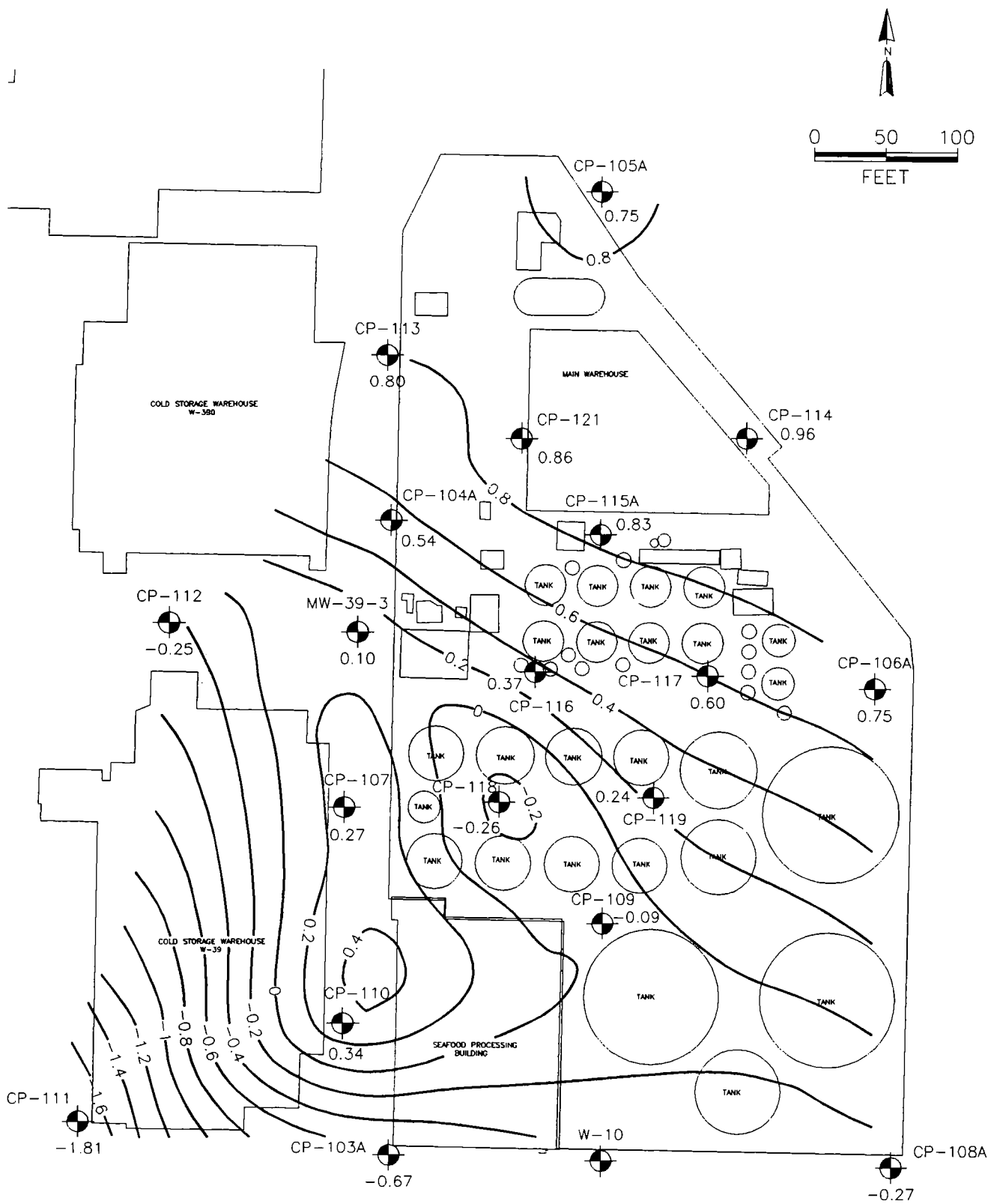
Drilled By Holt Drilling

Date Completed 12/2/87

Logged By S. R. Henshaw

WELL DETAILS	PENE- TRATION TIME/ RATE	DEPTH (FEET)	SAMPLE		PERME- ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
		10					See Boring Log CP-103-B	
2-inch Schedule 40 PVC Screen w/0.010" Slots 8-12 Colorado Silica Sand 2-inch Schedule 40 PVC Casing		20					Terminated boring at 15' 12/2/87	

SEA-300-01



Note: All locations shown are approximate.

WEST GARFIELD STREET (viaduct)



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
May 1993
Pier 91 Facility

DWN:

drp

DES.:

CHKD:

APPD:

DATE:

9/21/93

REV.:

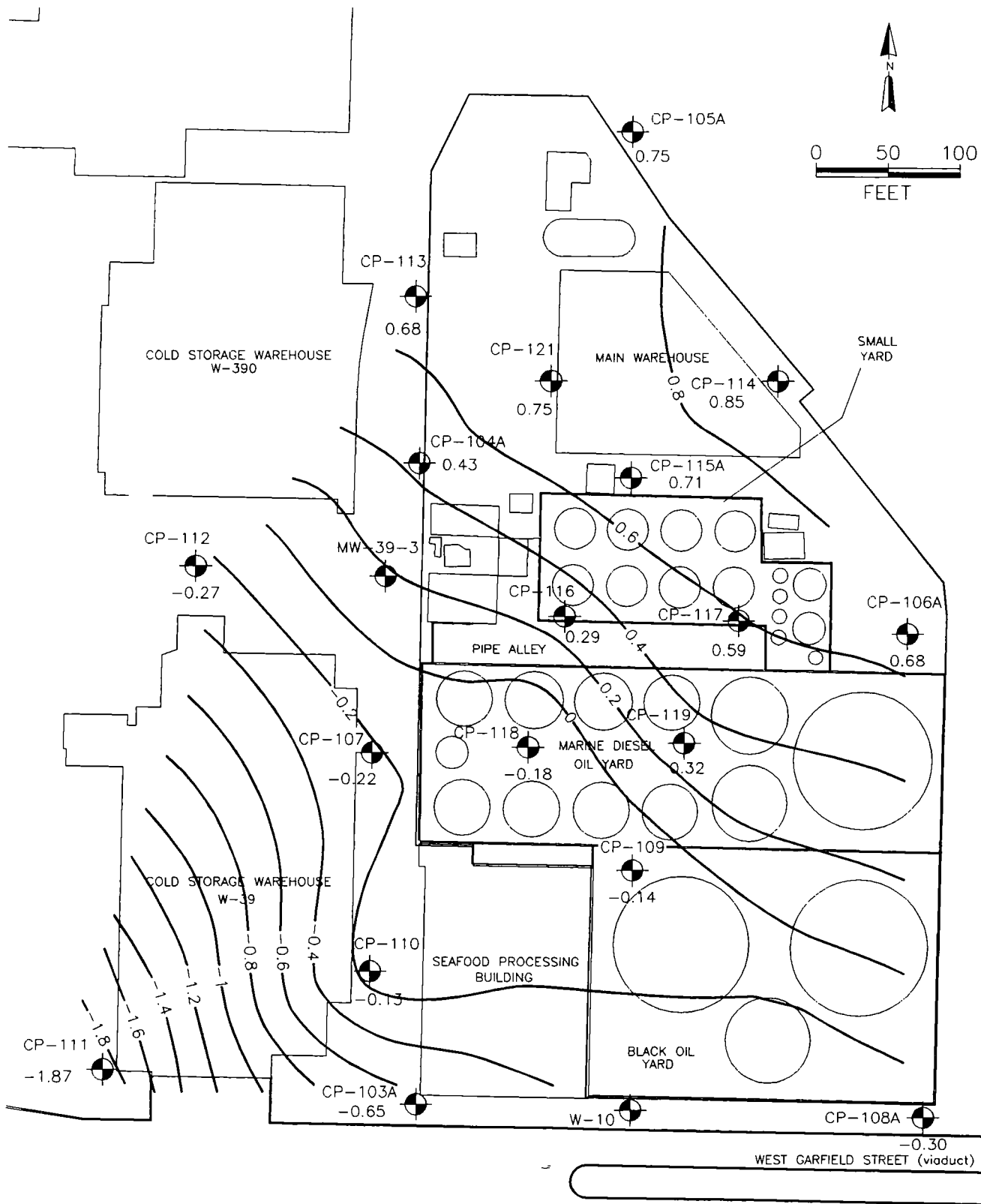
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PROJECT NO.:

624878

FIGURE NO.:

16



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
March 1993
BE Pier 91 Facility

DWN:

drp

DES.:

CHKD.

APPD:

DATE:

9/27/93

REV.:

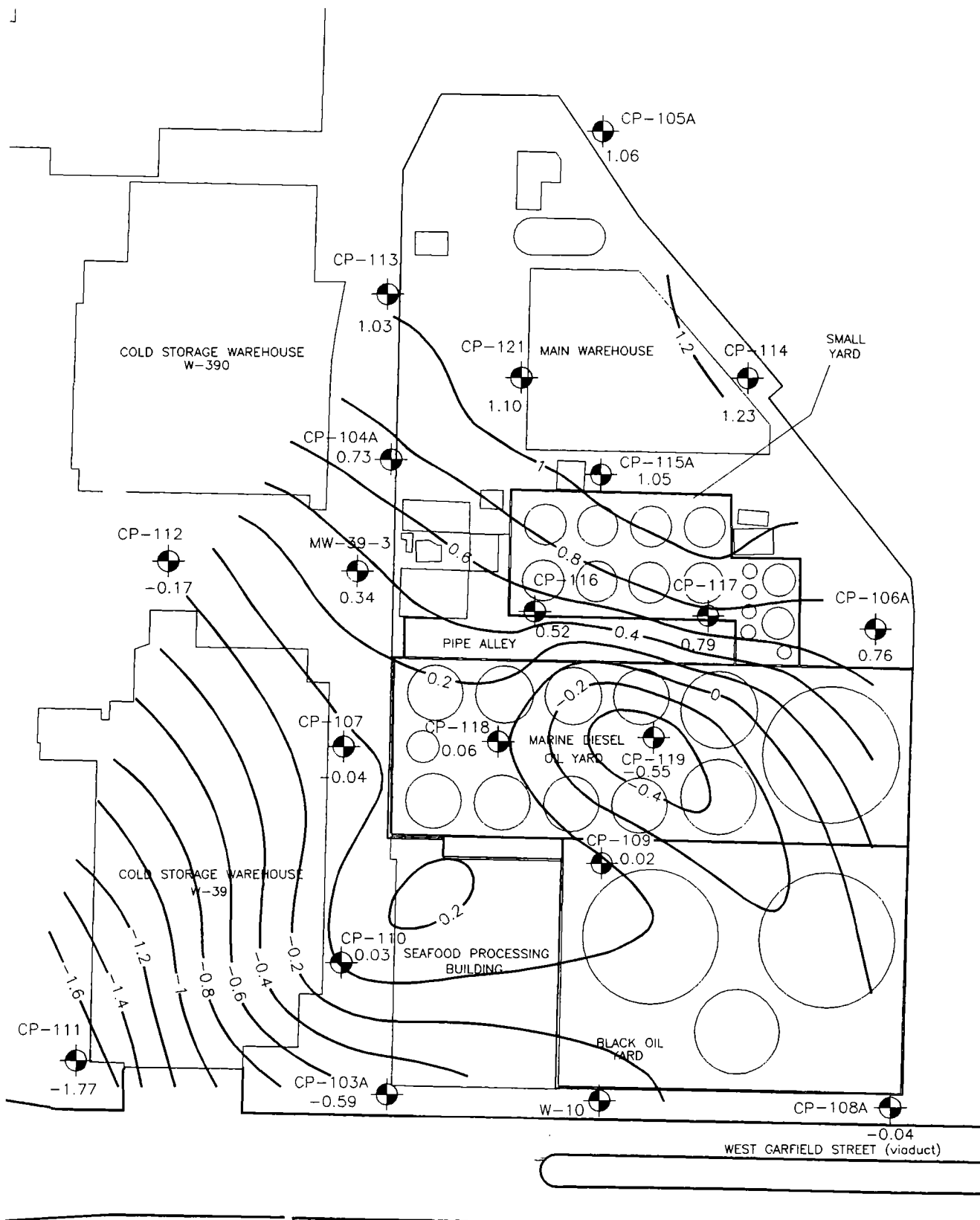
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PROJECT NO.:

624878

FIGURE NO.:

14



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
April 1993
BE Pier 91 Facility

DWN:

CHKD:

DATE:
9/27/93

DES:

APPD:

REV:

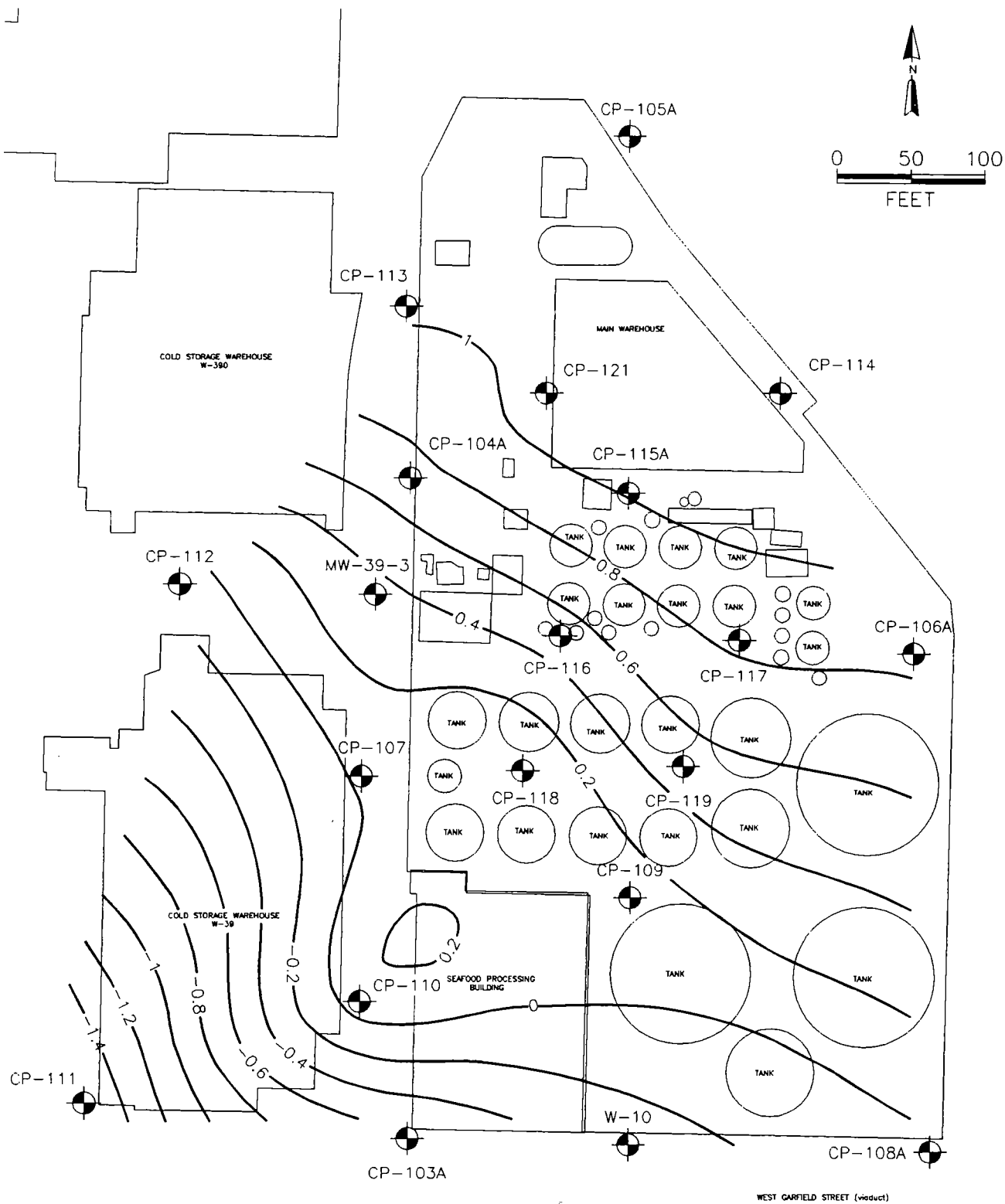
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PROJECT NO.:

624878

FIGURE NO.:

15



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
June 1993
Pier 91 Facility

OWN:

drp

DES.:

CHKD:

APPD:

DATE:

9/21/93

REV.:

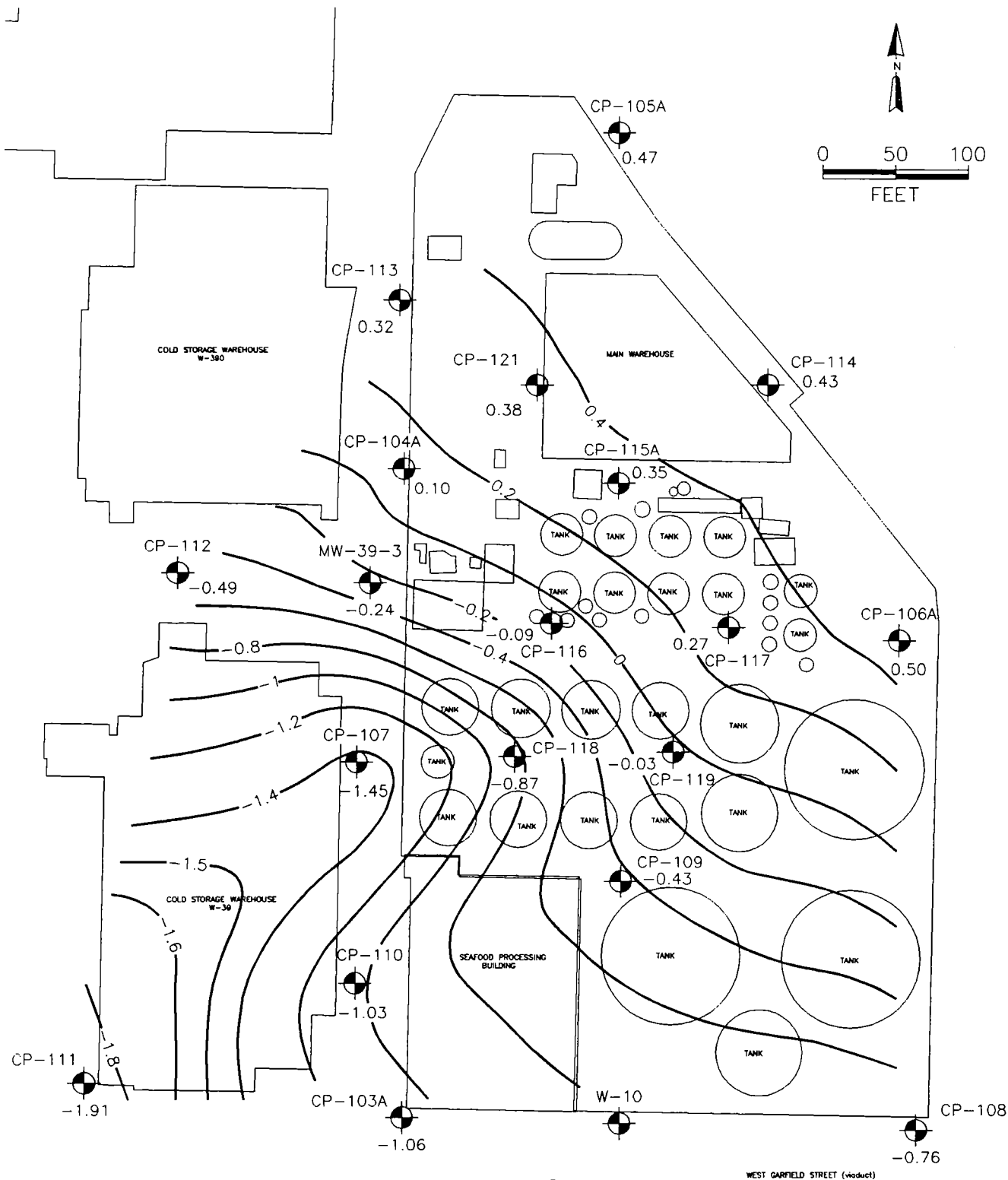
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PROJECT NO.:

624878

FIGURE NO.:

17



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
July 1993
Pier 91 Facility

DWN:

drp

DES.:

CHKD:

APPD:

DATE:

9/21/93

REV.:

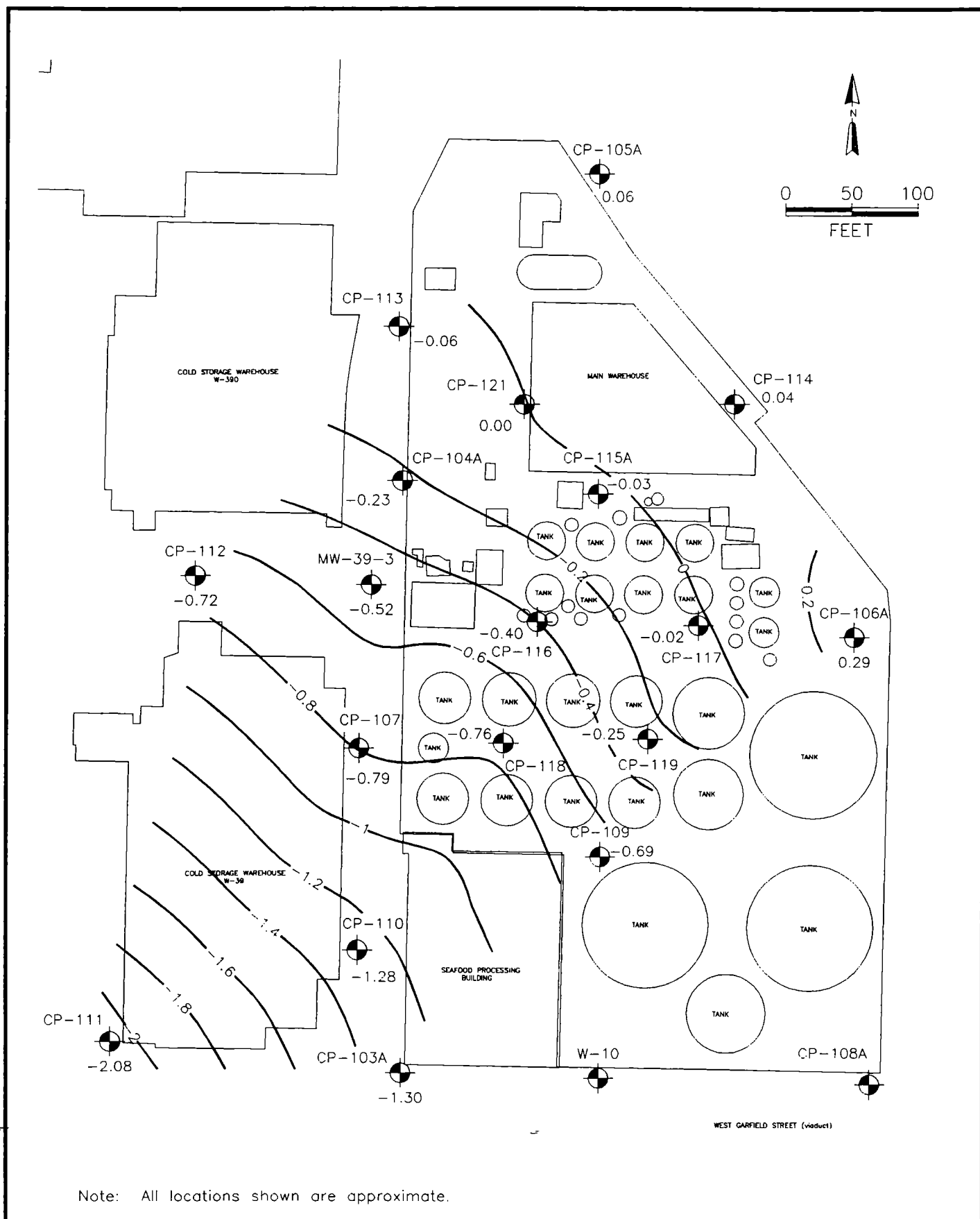
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PROJECT NO.:

624878

FIGURE NO.:

18



BURLINGTON
ENVIRONMENTAL

TITLE:
Shallow Aquifer Hydraulic Head
August 1993
Pier 91 Facility

DWN:
drp

CHKD:

DATE:
9/21/93

DES.:

APPD:

REV.:

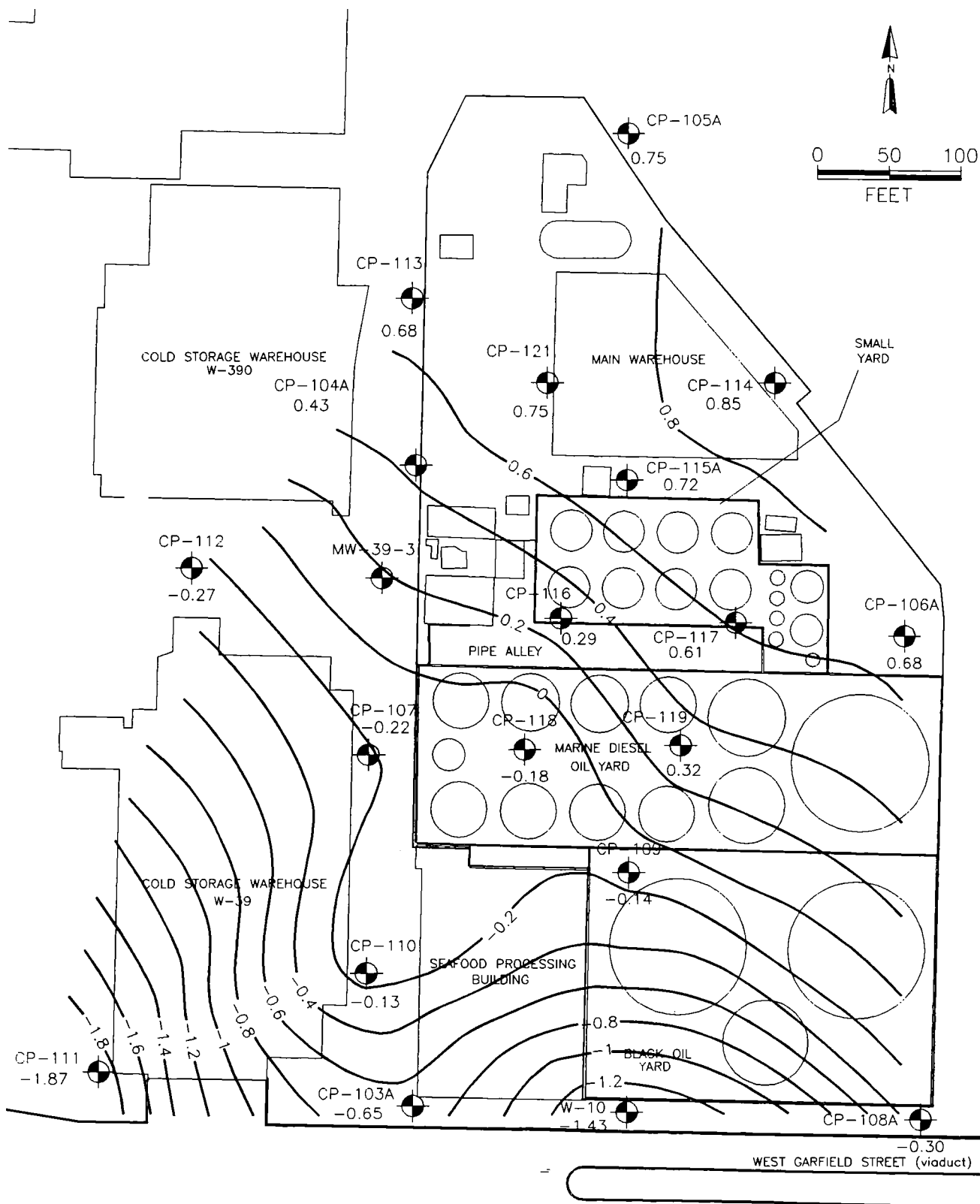
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PROJECT NO.:

624878

FIGURE NO.:

19



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
March 1993
Pier 91 Facility

DWN:

drp

CHKD:

DES.:

APPD:

DATE:

9/23/93

REV.:

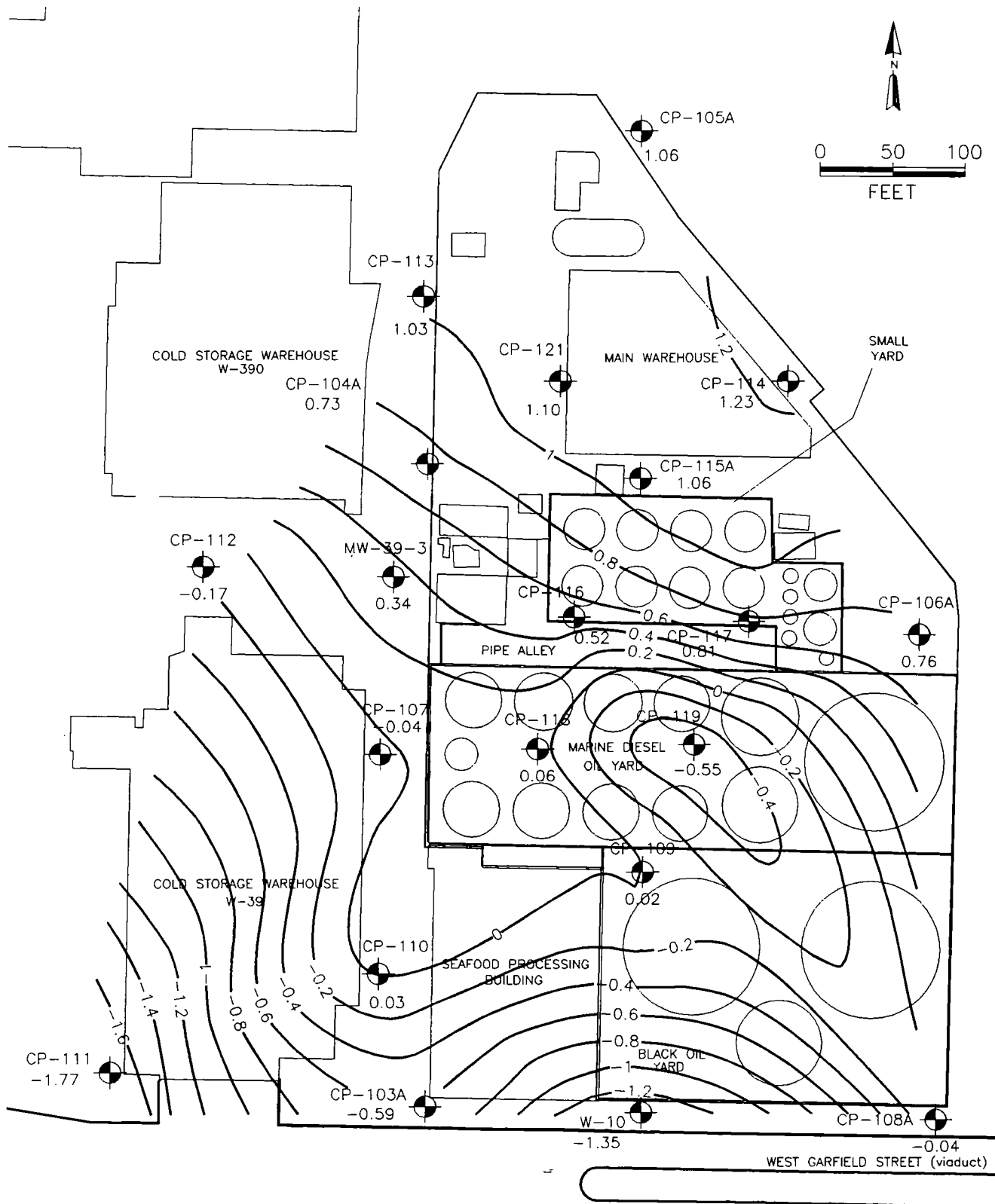
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PROJECT NO.:

624878

FIGURE NO.:

20



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
April 1993
Pier 91 Facility

DWN:

drp

DES.:

CHKD:

APPD:

DATE:

9/23/93

REV.:

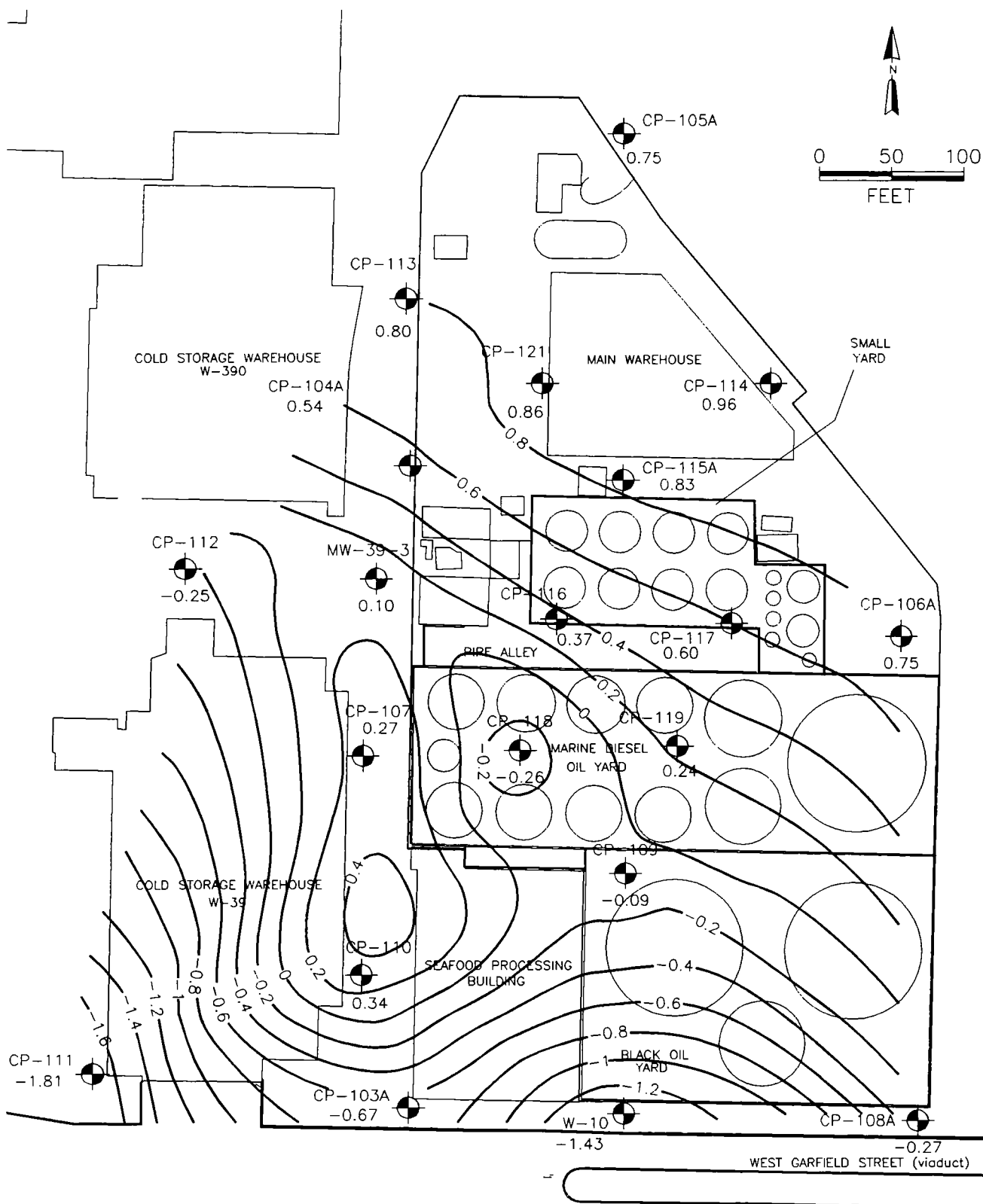
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PROJECT NO.:

624878

FIGURE NO.:

21



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
May 1993
Pier 91 Facility

DWN:

drp

DES:

CHKD:

APPD:

DATE:

9/23/93

REV:

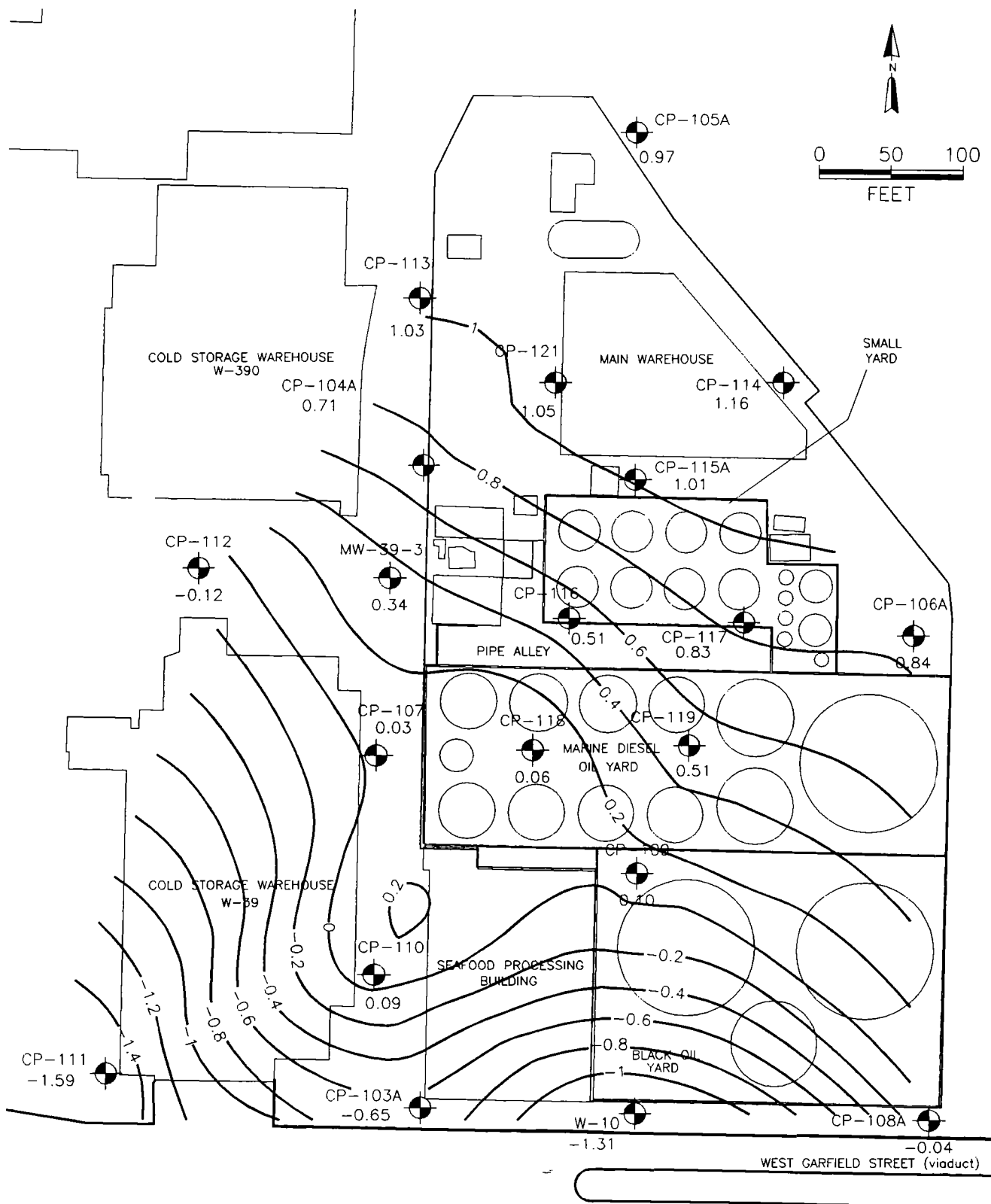
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PROJECT NO.:

624878

FIGURE NO.:

22



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:
Shallow Aquifer Hydraulic Head
June 1993
Pier 91 Facility

DWN: drp

CHKD:

DATE: 9/23/93

DES.:

APPD:

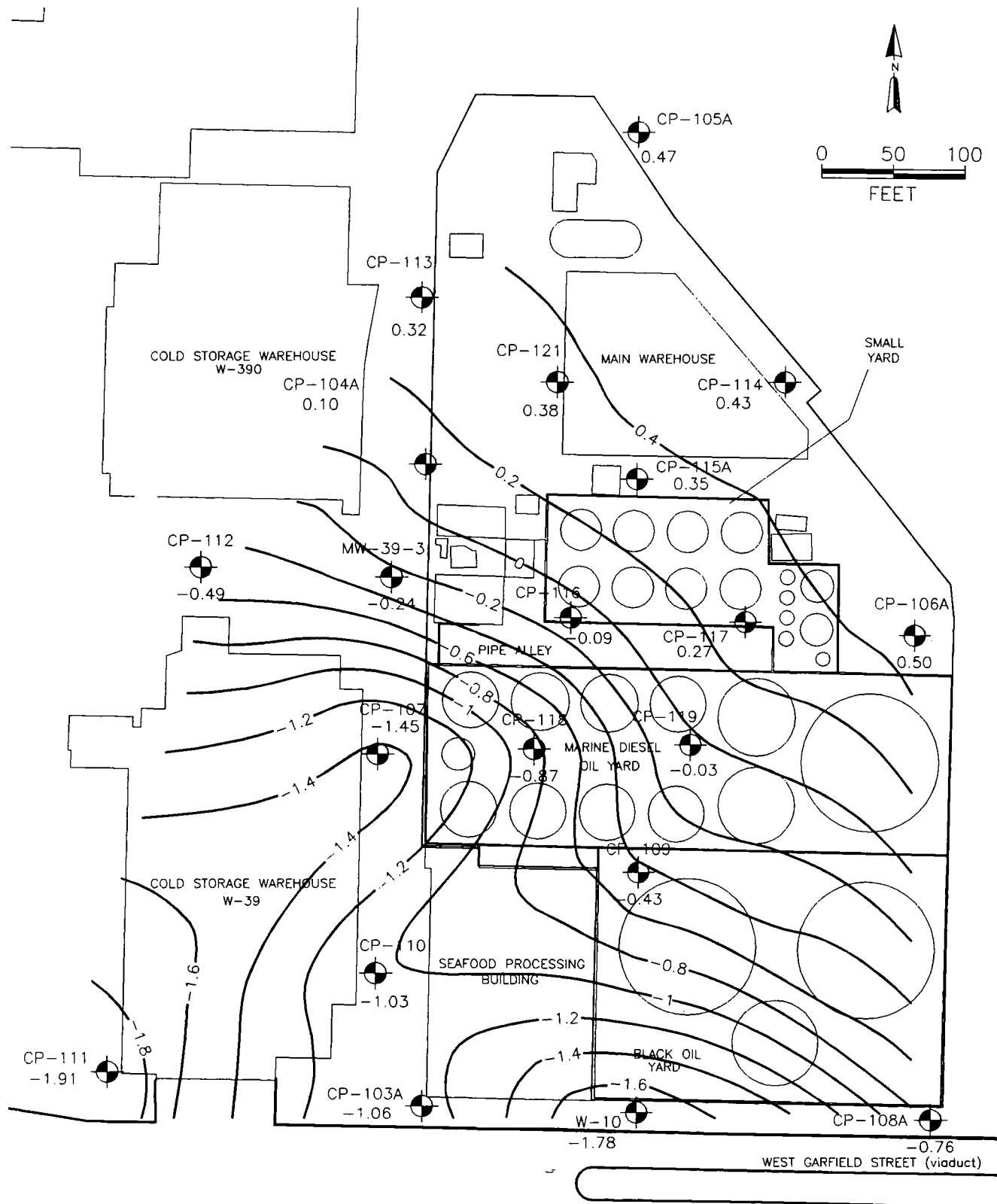
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PROJECT NO.:

624878

FIGURE NO.:

23



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
July 1993
Pier 91 Facility

DWN:

drp

DES.:

CHKD:

APPD:

DATE:

9/23/93

REV.:

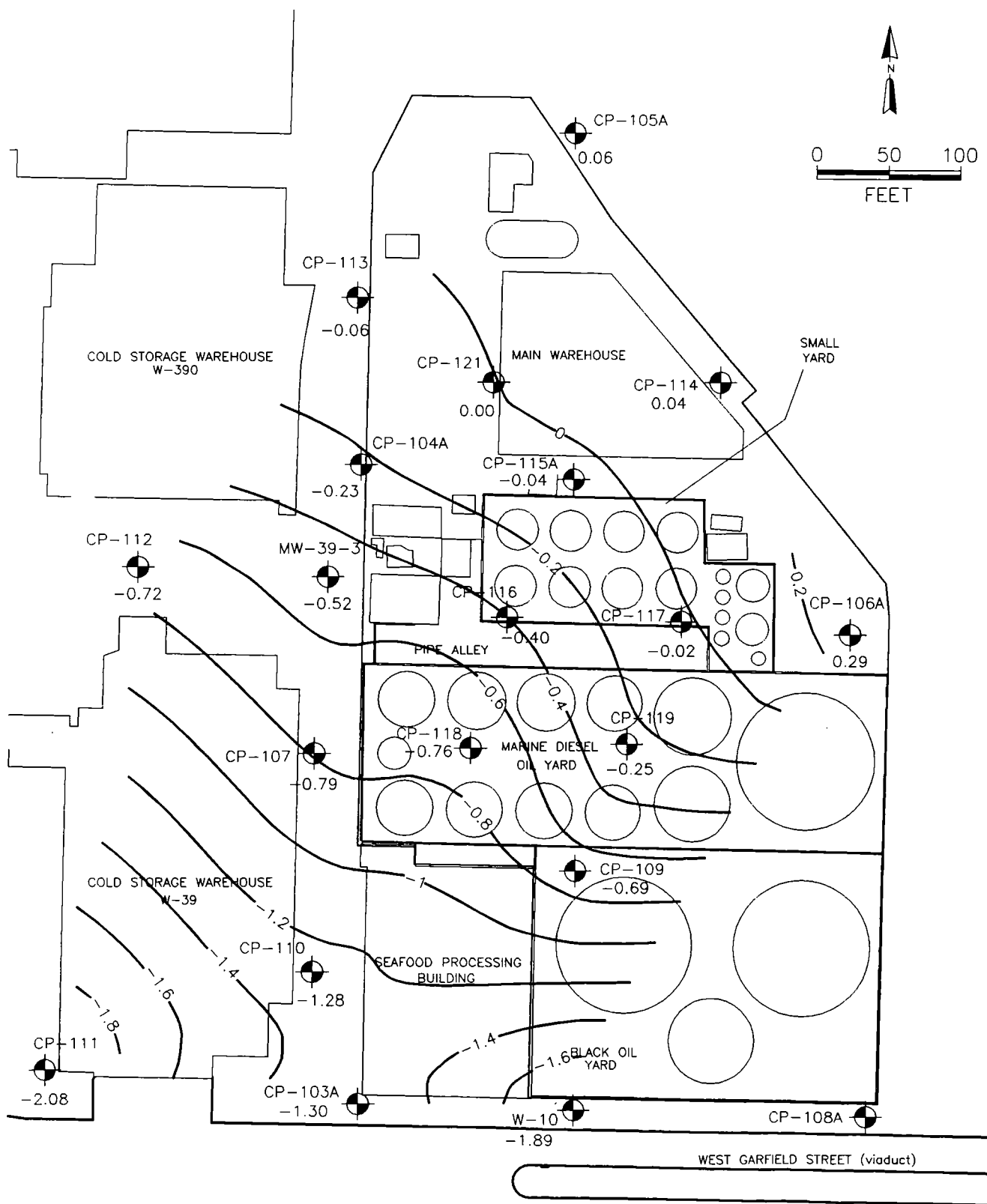
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PROJECT NO.:

624878

FIGURE NO.:

24



Note: All locations shown are approximate.



BURLINGTON
ENVIRONMENTAL

TITLE:

Shallow Aquifer Hydraulic Head
August 1993
BE Pier 91 Facility

DWN:

drp

CHKD:

DES.:

APPD:

DATE:

9/27/93

REV.:

1

PROJECT NO.:

624878

FIGURE NO.:

26